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June 30, 1998
File #530-3.5

Mr. Frank F. Faranca
Case Manager
New Jersey Department of Environmental Protection
Division of Responsible Party Site Remediation
Bureau of Federal Case Management
401 East State Street, 5th Floor
CN 028
Trenton, New Jersey 08625-0028

Re: Lenox China, Pomona, New Jersey
Statistical Monitoring Program and Classification Exception Area (CEA)

Dear Mr. Faranca:

This letter is a revision to our October 14, 1997 letter regarding the statistical monitoring program and the Classification Exception Area (CEA) at the Lenox China (Lenox) facility, Pomona, New Jersey. This letter also responds to the New Jersey Department of Environmental Protection (NJDEP) December 16, 1997 comment letter and telephone conversations with you and Daryl Clark (NJDEP Bureau of Ground Water Pollution Abatement). As requested by the Department, copies of this letter are being sent and applications for any new active remedial alternatives will be sent to the Pinelands Commission.

Background

The statistical monitoring program was intended to determine existing background concentrations of lead and zinc with sufficient confidence to establish CEA boundaries encompassing the Lenox facility and adjacent properties. The program was accomplished 1) by developing a statistically reliable monitoring database to establish existing background concentrations of lead and zinc in groundwater at the Lenox site, and 2) by subjecting the database to the appropriate statistical analysis to establish existing background concentrations, taking into account the areal, temporal (seasonal and short term), sampling and analytical variabilities inherent in any groundwater monitoring program.

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Groundwater Monitoring

The natural variability in the data includes the complex relationship of short-term components (rainstorms) superimposed on spatial and long-term (seasonal) variations. Additionally, the data is influenced to some degree by the uncertainty in sampling and analytical procedures.

Groundwater samples were collected from nine monitoring wells on and adjacent to the Lenox facility. To address possible spatial variability in background groundwater quality, the initial background concentrations were determined based on data from three upgradient monitoring wells: MW-1 on the Lenox western property boundary and MW-3F and MW-6F on the Blue Heron golf course west of the Lenox facility across Tilton Road. Downgradient wells MW-73 and MW-74, on the eastern property boundary; MW-12S and MW-13 on the undeveloped property east of the Lenox facility across Aloe Street; and MW-75 and MW-79A on the White Horse Pike right-of-way were also monitored.

Groundwater sampling was conducted in accordance with the NJDEP-approved Lenox China Supplemental Groundwater Sampling and Analysis Plan (April 1996). Filtered and unfiltered samples were collected from each monitoring well and analyzed for lead and zinc. Groundwater samples were collected monthly between August 1994 and September 1995 and quarterly between September 1995 and September 1997. Four replicate samples were collected from each well to address analytical variability.

Statistical Analysis Procedure

The statistical analysis procedures were conducted in accordance with the requirements and recommendations specified in USEPA 53 CFR 39720 (October 11, 1988). These procedures, which are used to determine whether there is a significant difference between upgradient and downgradient monitoring data, are termed Analysis of Variance (ANOVA) and they are defined in the Interim Final Guidance, USEPA, 1989, (530-SW-89-026).

ANOVAs' may be parametric or nonparametric. Parametric ANOVA procedures assume that the raw or logarithmically transformed data follow normal distribution. Parametric ANOVA procedures should not be used if the data base contains more than 15 percent of non-detects. Nonparametric ANOVA techniques can be used when the data does not follow normal distribution and/or contains a significant amount of non-detects.

The groundwater monitoring data was analyzed using the nonparametric ANOVA Kruscal-Wallis technique because the percentage of non-detects for individual monitoring wells varied from 0 to 99

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percent. The Groundwater Tracking System with Statistical analysis software package (GRIT/STAT v. 4.2) developed by the USEPA (EPA/625/11-91/002) was used in the statistical calculation.

Statistical Analysis Assumptions

Analytical data for each parameter at each downgradient monitoring well were compared to the analytical data for each parameter from the upgradient monitoring wells. Non-detects were assumed to be equal to one-half of the laboratory minimum detection limit. The 5 percent Type 1 error level of significance was used for all multiple well comparisons in accordance with N.J.A.C. 7:14A-6.15h(8).

Findings (Lead and Zinc)

The statistical analysis shows no significant difference in lead or zinc concentrations between upgradient monitoring wells and downgradient monitoring wells MW-12S, MW-13, MW-75, and MW-79A as measured in filtered and unfiltered groundwater samples. The statistical analysis also shows that lead and zinc were detected in unfiltered groundwater samples collected from downgradient wells MW-73 and MW-74 at concentrations greater than those detected in upgradient monitoring wells. (However, although we realize that the Department does not recognize filtered groundwater sample results, lead and zinc were detected in filtered groundwater samples from MW-73 and MW-74 at mean concentrations considerably lower than those detected in the unfiltered groundwater samples from MW-73 and MW-74). The statistical monitoring results are summarized in Tables 1 through 9. GRIT/STAT data are summarized in Appendix A. The statistical analysis findings are summarized below:

Unfiltered Samples

- Lead was detected in unfiltered samples from upgradient wells MW-1 (7.4 μg/l), MW-3F (4.1 μg/l), and MW-6F (4.3 μg/l) at mean concentrations less than the 10 μg/l groundwater protection limit.

- Zinc was detected in unfiltered samples from upgradient wells MW-1 (36.7 μg/l) and MW-3F (33.4 μg/l) at mean concentrations greater than the 30 μg/l groundwater protection limit.

- Lead was detected in unfiltered samples from downgradient wells MW-12S (1.7 μg/l), MW-13 (1.7 μg/l), MW-75 (4.8 μg/l), and MW-79A (1.8 μg/l) at concentrations below the 10 μg/l groundwater protection limit. There is no

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significant statistical difference between the mean concentration of lead in these downgradient wells and in upgradient well MW-1 (7.4 μg/l).

- Zinc was detected in unfiltered samples from downgradient wells MW-12S (26.2 μg/l), MW-13 (25.5 μg/l), MW-75 (24.9 μg/l), and MW-79A (23.4 μg/l) at concentrations below the 30 μg/l groundwater protection limit. The mean concentration of zinc in these downgradient wells is less than in upgradient wells MW-1 (36.7 μg/l) and MW-3F (33.4 μg/l).

- Lead and zinc were detected in unfiltered samples from downgradient wells MW-73 [29.96 μg/l (lead) and 68.0 μg/l (zinc)] and MW-74 [18.95 μg/l (lead) and 101.18 μg/l (zinc)] at mean concentrations greater than the upgradient monitoring wells. These results were expected because MW-73 and MW-74 are located immediately downgradient of SWMU #2 and the Area of Concern.

Filtered Samples

- Lead was detected in filtered samples from upgradient wells MW-1 (1.7 μg/l), MW-3F (2.3 μg/l), and MW-6F (1.8 μg/l) at mean concentrations less than the 10 μg/l groundwater protection limit.

- Zinc was detected in filtered samples from upgradient well MW-3F (38.5 μg/l) at a mean concentration greater than the 30 μg/l groundwater protection limit.

- Lead was detected in filtered samples from downgradient wells MW-12S (1.5 μg/l), MW-13 (1.6 μg/l), MW-75 (1.6 μg/l), and MW-79A (1.5 μg/l) at mean concentrations below the 10 μg/l groundwater protection limit. There is no significant statistical difference between the mean concentration of lead in these downgradient wells and in upgradient wells MW-1(1.7 μg/l), MW-3F (2.3 μg/l), and MW-6F (1.8 μg/l).

- Zinc was detected in filtered samples from downgradient wells MW-12S (21.4 μg/l), MW-13 (26.1 μg/l), MW-75 (18.0 μg/l), and MW-79A (24.0 μg/l) at mean concentrations less than the 30 μg/l groundwater protection limit. The mean concentration of zinc in these downgradient wells is less than in upgradient wells MW-1 (29.7 μg/l) and MW-3F (38.6 μg/l).

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- Lead and zinc were detected in filtered samples from downgradient wells MW-73 [4.21 μg/l (lead) and 38.32 μg/l (zinc)] and MW-74 [1.87 μg/l (lead) and 63.92 μg/l (zinc)] at mean concentrations greater than the upgradient monitoring wells MW-1 and MW-6F. These results were expected because MW-73 and MW-74 are located immediately downgradient of SWMU #2 and the Area of Concern.

Findings (TCE)

The areal and vertical extent of TCE in groundwater was defined during the Geraghty & Miller (G&M) groundwater investigations between 1987 and 1990, and by quarterly groundwater monitoring implemented by Lenox in 1991. The downgradient extent of TCE, using an estimated 1 μg/l contour developed from groundwater sampling data, is approximately 2,500 feet downgradient of the Lenox plant. The approximate width of the plume using a 1 μg/l contour determined at several sidegradient wells is 1,400 feet.

G&M's investigation concluded that the distribution of TCE in the water table aquifer was limited vertically by a discontinuous clay layer at approximately 70 feet below grade. This clay layer was encountered in several borings drilled at the site and in borings drilled along White Horse Pike.

Classification Exception Area (CEA) Overview

The CEA is an administrative control which establishes an area of the Lenox site where concentrations of lead and zinc are statistically higher than those in upgradient monitoring wells and TCE concentrations exceed the 1 μg/l MCL. The CEA also establishes a way to evaluate the effectiveness of the remedial actions/engineering controls through groundwater monitoring and semi-annual treatment system evaluations.

Lenox has implemented remedial actions/engineering controls (such as source removal and capping) to control lead and zinc migration from source areas. Lenox installed a GWCAS in 1991 to extract TCE contaminated groundwater downgradient of the plant and to limit the migration of the two TCE plumes. The GWCAS is evaluated semi-annually in accordance with NJDEP regulations, and the results of these evaluations show that the GWCAS is effectively remediating the contaminated groundwater. The areas in each plume which contained the highest concentrations of TCE were captured by the extraction well system. Groundwater elevation measurements made during the quarterly monitoring rounds show that the zone of influence created by the extraction well system captures the full width of the TCE plumes.

Lenox proposes natural attenuation as the only practical groundwater remedy for lead and zinc within the CEA. Lenox believes that natural attenuation is applicable because lead and zinc are strongly bound to soil through ion exchange with iron which occurs at naturally high concentrations

in groundwater at the Lenox site. A brief description of the lead and zinc attenuation mechanism (as abstracted from Chemical Attenuation Rates, Coefficients, and Constants in Leachate Migration, Battelle, Pacific Northwest Laboratories, February 1984) is included in Appendix B.

Lenox proposes natural attenuation to remediate trace TCE concentrations between the northeast CEA boundary and White Horse Pike and natural attenuation combined with continued operation of the GWCAS to reduce TCE concentrations within the CEA boundary. Natural remediation of trace TCE concentrations within the CEA boundary and between the northeast CEA boundary and White Horse Pike is expected to occur through oxidation with organic matter in the aquifer. A brief description of the natural remediation of TCE (as abstracted from Natural Attenuation, P. Brady, M. Brady, D. Borns, 1997) is included in Appendix B.

The CEA drawings (Figures 1 and 2) were prepared to distinguish between the lead and zinc boundary (cross-hatch area) and the TCE boundary. The final CEA drawings will be compatible with the Department's GIS format. The CEA boundary will extend from upgradient well MW-1 to downgradient well MW-12S on the north side of the property, from MW-12S to the west side of White Horse Pike directly across from MW-75, from this point south parallel to White Horse Pike to a point directly across from MW-79A, from this point west to MW-81, and from MW-81 to MW-1 on the south side of the property. The CEA boundary will encompass monitoring wells MW-73 and MW-74, the GWCAS extraction wells, and the monitoring wells along Atlantic Avenue within the Atlantic Avenue right-of-way. The CEA vertical boundary will be the upper 70-feet of the Cohansey Aquifer. Monitoring wells along the White Horse Pike (MW-75 and MW-79A) will be used as downgradient sentinel wells to verify CEA compliance.

Classification Exception Area (CEA) Response to N.J.A.C. 7:26E-6.3(d) 1.i for Documenting Natural Attenuation of Metal Contaminants

Lenox requests a variance in response to N.J.A.C. 7:26E-6.3(d) 1.i based on the following:

N.J.A.C. 7:26E-6.3(d) 1.i states: "The person responsible for conducting the remediation shall evaluate the following site conditions to determine the viability of natural remediation:

a) Contaminant mass, as determined by free or residual product and dissolved phase delineation and dissolved contaminant concentration;
b) Dissolved oxygen content of groundwater;
c) Presence of microorganisms in soil or groundwater;
d) Groundwater flow velocity; and
e) Applicable physical or chemical characteristics of contaminants and contaminant degradation products present in soil and groundwater."

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a) Not applicable. It would not be possible to reliably distinguish between the mass of lead and zinc introduced from site operations and the mass of elemental lead and zinc naturally present in the groundwater and soil.

b) Not applicable. The dissolved oxygen content of groundwater would not effect the natural attenuation of lead and zinc.

c) In general, the presence or absence of microorganisms in soil or groundwater will not effect the natural attenuation of lead and zinc.

d) Geraghty and Miller (G&M) conducted a constant-rate pumping test on recovery well RW-1 in 1988. Drawdown in three piezometers was analyzed by the Boulton delayed-yield method. The groundwater flow velocity was calculated at 0.45 feet per day, using an average transmissivity of 63,000 gallons per day per foot (gpd/ft), a hydraulic gradient of 0.001 ft/ft (measured in 1990 by G&M), and an estimated porosity of 30 percent.

The statistical analysis shows that lead and zinc were detected in groundwater samples from monitoring wells (MW-73 and MW-74) immediately adjacent to the SWMU #2 and the Area of Concern (the source areas) at concentrations greater than those detected in upgradient monitoring wells. However, there was no significant difference in lead or zinc concentrations between upgradient monitoring wells and monitoring wells (MW-75, and MW-79A) downgradient of MW-73 and MW-74. The statistical analysis shows that lead and zinc are localized to the source area and did not migrate despite a high groundwater flow velocity through the aquifer.

e) Not applicable. Elemental characteristics do not change over time.

<u>Classification Exception Area (CEA) Response to N.J.A.C. 7:26E-6.3(d) 1.ii for Documenting Natural Attenuation of Metal Contaminants</u>

N.J.A.C. 7:26E-6.3(d) 1.ii states "The person responsible for conducting the remediation may evaluate the following site conditions to determine the viability of natural remediation, if applicable:
a) Sorptive and desorptive characteristics of the soil and groundwater; and
b) Other applicable physical and chemical characteristics of soil."

Based on Lenox's proposed method for natural attenuation, examples of site specific soil and groundwater information to be submitted include i) iron and manganese concentrations, ii) pH levels, iii) soil clay content, iv) soil organic matter, and v) any other applicable information that will

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demonstrate that conditions are favorable for ion exchange or specific adsorption of the lead and zinc.

i) Lead and zinc strongly bond to soil through ion exchange with iron and manganese oxides. Groundwater samples collected between August 1994 and November 1995 show that iron and manganese occur at high concentrations in groundwater at the Lenox site (Table 10). Iron was detected at concentrations exceeding the 300 μg/L Class IIA Ground Water Quality Criteria (GWQC) with an average concentration of 2,129 μg/L. Manganese was detected at concentrations exceeding the 50 μg/L GWQC with an average concentration of 74 μg/L. The sampling shows that the aquifer contained elevated levels of iron and manganese which promote adsorption of lead and zinc. Thorton Hole, a USDA Soil Scientist (telephone 609-561-3223), indicated that USDA studies show elevated concentrations of iron in soil throughout Atlantic County.

ii, iii, and iv) The USDA/SCS Soil Survey of Atlantic County, New Jersey indicates that Filled Land, Klej Loamy Sand, Berryland Sand, and Downer Loamy Sand are the dominant soil types at the site. The approximate distribution of these soils is 50 percent, 20 percent, 10 percent, and 20 percent, respectively. A portion of the area defined by the SCS as Filled Land is now covered by the manufacturing plant (approximately 350,000 square feet) and paved areas.

Filled Land generally consists of areas which have been backfilled with several feet of quartz sand and gravel which typically has a very low organic matter content and a low available water capacity. Permeability is generally rapid unless the backfill contains fines, therefore, Filled Land is usually considered excessively drained. Klej Loamy Sands are rapidly permeable and have low available water capacities. These soils are very acidic with pH ranging from 3.6 to 4.4. These soils contain the same clay amount in the subsoil as in the surface layer and have a low organic matter content. Downer Loamy Sands are well drained soils with low organic matter content and are strongly acidic (pH ranging from 3.6 to 4.4) These soils are moderately permeable. Berryland Sand is generally characterized by poorly drained, nearly level soils with intermittent high organic subsoil content. These soils are very acidic (pH ranging from 3.6 to 4.4). Permeability is moderately rapid.

Groundwater monitoring from 1993 through 1998 shows that pH at the Lenox site ranges from 3.87 to 7.06 standard units.

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Classification Exception Area (CEA) Compliance

CEA compliance for lead and zinc will be determined by a statistical comparison of the downgradient sentinel well groundwater monitoring results and the arithmetic mean calculated for zinc in upgradient monitoring well MW-1 (36.7 μg/l) and the 10 μg/l groundwater protection limit for lead. CEA compliance for TCE will be determined by comparing the monitoring results from the downgradient sentinel wells to the 1 μg/l GWQC and by using the Mann-Whitney U-Test (N.J.A.C. 7:26E Appendix C). Monitoring wells along White Horse Pike (MW-75 and MW-79A) will be used as downgradient sentinel wells to verify CEA compliance. An addendum to the Supplemental Groundwater Sampling and Analysis Plan describing the CEA compliance frequency is in Appendix C.

Groundwater Use Area

The Department considers the CEA area to be a groundwater use area. Lenox will notify the municipality (Galloway Township) and property owners within the CEA boundary. A Well Restriction Area memorandum is in Appendix D.

This letter supplements our previous submission and completes Lenox's Classification Exception Area application. Please call me if you have any questions.

Very truly yours,

EDER ASSOCIATES - A DIVISION OF GANNETT FLEMING, INC.

Mark Foley
Project Manager

cc: L. Fantin, Esq. (Lenox)
J. Kinkela (Lenox)
G. Berman (Lenox)
A. Park (USEPA)
D. Clark (NJDEP)
T. DeJesus (Pinelands Commission)

FIGURES

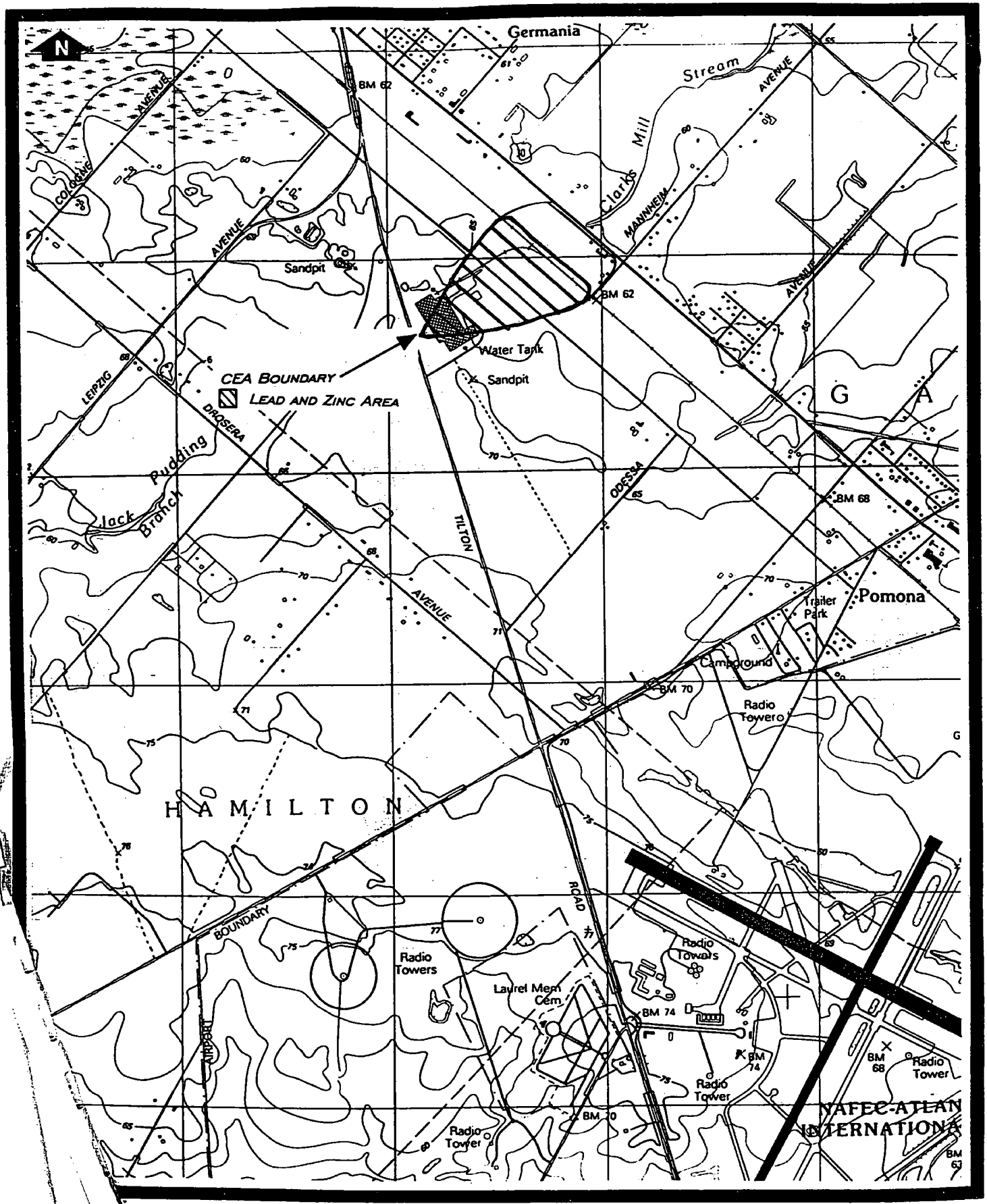

FIGURE 1 - CEA LOCATION MAP

LENOX CHINA, TILTON ROAD, POMONA, NEW JERSEY

Scale 1:24,000 Contour Interval 5 feet

Longitude 74.36.08 Latitude 39.29.12

USGS 7.5 Minute Series, Topographic Map - Pleasantville, NJ, 1989

TABLES

LENOX CHINA
POMONA, NEW JERSEY

TABLE 1

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-1

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	6.7	4.4	4.8	6.2	< 3.0	< 3.0	< 3.0	< 3.0
September 1994	8.2	5.7	5.1	3.5	4.5	< 3.0	< 3.0	3.0
October 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
December 1994	< 3.0	3.7	< 3.0	3.7	< 3.0	< 3.0	< 3.0	< 3.0
January 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	3.2	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
March 1995	< 3.0	< 3.0	4.4	3.1	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	3.4	3.7	3.3	3.8	< 3.0	< 3.0	< 3.0	< 3.0
May 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	3.9	3.5	4.2	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	7.2	3.9	5.1	5.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	23.0	22.6	24.5	22.6	< 3.0	4.2	< 3.0	< 3.0
April 1996	34.0	36.1	45.4	51.1	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	25.0	25.8	32.5	32.0	4.0	< 3.0	< 3.0	< 3.0
October 1996	6.5	7.7	6.3	8.1	< 3.0	< 3.0	6.0	< 3.0
January 1997	3.7	4.4	5.6	4.4	< 3.0	< 3.0	4.2	< 3.0
April 1997	3.2	3.5	3.9	6.9	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	< 3.0	5.9	6.0	6.2	< 3.0	< 3.0	3.5	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 1 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 20.0	< 20.0	22.0	30.0	25.0	23.0	< 20.0	< 20.0
September 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1994	< 20.0	37.0	27.0	34.0	< 20.0	40.0	37.0	35.0
December 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
January 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
March 1995	< 20.0	< 20.0	26.0	26.0	< 20.0	26.0	20.0	33.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	26.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
June 1995	24.0	22.0	22.0	31.0	27.0	< 20.0	24.0	< 20.0
July 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
August 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1995	22.3	< 20.0	< 20.0	< 20.0	30.5	23.0	< 20.0	< 20.0
February 1996	33.4	35.2	31.3	23.8	20.9	< 20.0	< 20.0	< 20.0
April 1996	49.0	54.5	55.5	59.7	23.0	22.4	25.0	21.7
July 1996	38.0	36.6	43.1	50.8	28.0	25.1	23.5	22.7
October 1996	535	460	***	232	79.0	578	429	262
January 1997	24.0	< 20.0	30.0	< 20.0	< 20.0	< 20.0	< 20.0	22.2
April 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
July 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 2

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-3F

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	4.3	4.4	5.1	4.0	4.1	4.6	4.4	4.1
September 1994	3.7	4.2	5.6	4.3	3.3	3.3	4.4	3.0
October 1994	9.5	3.2	3.6	3.3	< 3.0	3.1	3.2	3.2
November 1994	4.0	6.9	5.5	4.8	3.3	3.3	< 3.0	< 3.0
December 1994	3.0	< 3.0	3.3	3.1	< 3.0	4.9	< 3.0	< 3.0
January 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	< 3.0	< 3.0	< 3.0	< 3.0	3.0	< 3.0	< 3.0	< 3.0
March 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	4.0	4.3	3.8	4.6	3.0	3.2	< 3.0	4.8
May 1995	5.2	6.6	5.1	6.7	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	16.0	15.0	9.3	6.8	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	3.3	3.4	< 3.0	3.8	< 3.0	< 3.0	3.4	< 3.0
August 1995	5.0	4.6	3.8	3.5	3.6	3.1	3.4	5.2
November 1995	4.3	6.0	5.7	7.6	< 3.0	3.2	< 3.0	< 3.0
February 1996	5.2	5.5	4.4	5.2	< 3.0	3.5	< 3.0	< 3.0
April 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	3.7	< 3.0	< 3.0
July 1996	3.8	3.3	3.9	3.9	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	5.9	5.6	3.4	7.8	3.8	4.7	< 3.0	3.4
January 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	9.9	3.8	6.8	< 3.0	< 3.0	< 3.0	3.2	3.3

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 2 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 20.0	23.0	< 20.0	28.0	< 20.0	< 20.0	< 20.0	< 20.0
September 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1994	30.0	46.0	29.0	42.0	34.0	33.0	36.0	41.0
December 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
January 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
March 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	33.0	31.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	28.0	34.0	24.0	30.0	23.0	22.0	24.0	21.0
June 1995	48.0	47.0	48.0	40.0	29.0	27.0	34.0	30.0
July 1995	< 20.0	< 20.0	22.0	23.0	< 20.0	< 20.0	29.0	< 20.0
August 1995	< 20.0	< 20.0	27.0	< 20.0	< 20.0	< 20.0	20.0	< 20.0
November 1995	< 20.0	21.3	28.9	24.6	23.6	20.6	< 20.0	< 20.0
February 1996	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	21.2
April 1996	24.7	24.2	21.8	23.6	26.4	26.2	23.1	23.4
July 1996	22.5	25.7	153	23.3	22.5	21.3	25.2	23.2
October 1996	738	27.8	228	323	452	858	408	257
January 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	20.2
April 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	23.1
July 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0

NOTES:
All values in micrograms per liter (ug/l)

LENOX CHINA
POMONA, NEW JERSEY

TABLE 3

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-6F

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	7.7	6.1	7.7	6.2	3.2	3.3	3.7	3.4
September 1994	3.6	3.0	< 3.0	3.2	3.0	< 3.0	3.2	3.8
October 1994	4.1	5.4	5.0	7.4	3.1	3.1	< 3.0	3.3
November 1994	< 3.0	4.4	< 3.0	3.3	3.6	< 3.0	< 3.0	< 3.0
December 1994	< 3.0	< 3.0	< 3.0	3.2	3.7	< 3.0	< 3.0	< 3.0
January 1995	5.9	21.0	28.0	5.4	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	4.9	< 3.0	< 3.0	< 3.0	< 3.0	3.7	< 3.0	< 3.0
March 1995	5.0	5.9	6.8	8.7	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	5.6	5.3	6.4	4.8	< 3.0	< 3.0	< 3.0	< 3.0
May 1995	3.6	< 3.0	< 3.0	4.6	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	4.5	4.1	4.0	4.7	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	< 3.0	3.5	4.4	6.1	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	22.0	7.3	7.6	17.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	< 3.0	< 3.0	3.3	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	3.7	< 3.0	4.4	9.4	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	< 3.0	< 3.0	3.0	3.1	< 3.0	< 3.0	< 3.0	< 3.0
January 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1997	< 3.0	< 3.0	< 3.0	3.8	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 3 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	21.0	20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
September 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1994	33.0	35.0	36.0	< 20.0	31.0	35.0	< 20.0	< 20.0
December 1994	< 20.0	52.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
January 1995	< 20.0	< 20.0	20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
March 1995	< 20.0	< 20.0	< 20.0	< 20.0	25.0	23.0	38.0	23.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	21.0	< 20.0	< 20.0	< 20.0	27.0	< 20.0	< 20.0	< 20.0
June 1995	36.0	26.0	57.0	44.0	21.0	< 20.0	< 20.0	< 20.0
July 1995	32.0	29.0	< 20.0	26.0	< 20.0	22.0	< 20.0	< 20.0
August 1995	< 20.0	20.0	< 20.0	20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1996	< 20.0	24.0	< 20.0	21.6	< 20.0	< 20.0	< 20.0	21.6
April 1996	24.6	27.6	< 20.0	40.4	< 20.0	26.1	25.0	25.4
July 1996	26.2	141	22.2	28.0	26.5	28.0	24.5	27.3
October 1996	148	499	43.4	< 20.0	245	< 20.0	31.6	< 20.0
January 1997	23.8	20.6	21.1	25.0	20.5	20.6	< 20.0	22.2
April 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	35.3	< 20.0	< 20.0
July 1997	< 20.0	< 20.0	< 20.0	< 20.0	32.4	60.2	20.3	24.8

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 4

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-12S

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
September 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	3.3	< 3.0
December 1994	< 3.0	8.1	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
March 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	< 3.0	< 3.0	3.6	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
May 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	3.6	< 3.0	< 3.0	7.0	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 4 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
September 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	24.0
December 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
January 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
March 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	28.0	< 20.0	< 20.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	< 20.0	31.0	25.0	27.0	< 20.0	21.0	22.0	21.0
June 1995	< 20.0	21.0	20.0	33.0	< 20.0	24.0	21.0	25.0
July 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
August 1995	< 20.0	27.0	< 20.0	< 20.0	< 20.0	25.0	< 20.0	< 20.0
November 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1996	23.8	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
April 1996	23.0	< 20.0	24.9	< 20.0	22.0	20.6	23.6	< 20.0
July 1996	20.0	20.8	< 20.0	< 20.0	< 20.0	21.8	25.3	< 20.0
October 1996	207	587	302	NA	188	353	239	NA
January 1997	32.0	20.4	< 20.0	26.3	< 20.0	< 20.0	< 20.0	24.1
April 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
July 1997	< 20.0	< 20.0	25.4	70.8	< 20.0	< 20.0	< 20.0	< 20.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 5

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-13

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
September 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1994	< 3.0	< 3.0	< 3.0	< 3.0	4.0	< 3.0	< 3.0	< 3.0
December 1994	3.7	< 3.0	< 3.0	4.4	< 3.0	< 3.0	< 3.0	< 3.0
January 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
March 1995	< 3.0	3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	3.6	< 3.0	3.0	< 3.0	< 3.0	3.3	< 3.0	< 3.0
May 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1997	< 3.0	8.2	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	3.3	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 5 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 20.0	26.0	32.0	25.0	30.0	< 20.0	24.0	31.0
September 1994	< 20.0	< 20.0	< 20.0	< 20.0	23.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	24.0	< 20.0	< 20.0
November 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
December 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	63.0	< 20.0
January 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	< 20.0	< 20.0	< 20.0	30.0	< 20.0	22.0	37.0
March 1995	21.0	35.0	< 20.0	32.0	31.0	25.0	43.0	< 20.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	30.0	24.0	30.0	32.0	20.0	20.0	22.0	35.0
June 1995	30.0	25.0	23.0	25.0	27.0	27.0	25.0	35.0
July 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	21.0	< 20.0	< 20.0
August 1995	< 20.0	< 20.0	< 20.0	29.0	< 20.0	< 20.0	< 20.0	22.0
November 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1996	22.3	< 20.0	< 20.0	< 20.0	23.0	20.4	< 20.0	< 20.0
April 1996	33.0	28.2	27.7	28.8	27.0	31.8	37.0	28.1
July 1996	20.0	36.7	24.8	22.1	21.0	28.1	23.0	23.3
October 1996	224	209	141	332	196	182	238	185
January 1997	21.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
April 1997	< 20.0	< 20.0	21.8	< 20.0	< 20.0	< 20.0	23.3	20.7
July 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	21.3

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 6

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-73

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	I	D1	D2	D3	I	D1	D2	D3
Sample Month								
August 1994	26.0	20.0	26.0	27.0	< 3.0	< 3.0	< 3.0	< 3.0
September 1994	30.0	32.0	32.0	37.0	16.0	16.0	16.0	18.0
October 1994	13.0	12.0	11.0	10.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1994	5.2	4.1	3.8	3.2	< 3.0	< 3.0	< 3.0	< 3.0
December 1994	9.3	9.9	10.0	9.3	7.1	8.3	7.2	6.9
January 1995	19.0	17.0	10.0	14.0	18.0	20.0	23.0	20.0
February 1995	22.0	22.0	21.0	21.0	3.2	4.8	4.1	3.4
March 1995	9.7	8.7	8.3	8.8	3.4	< 3.0	< 3.0	< 3.0
April 1995	12.0	11.0	9.4	10.0	3.3	3.7	3.5	3.1
May 1995	35.0	36.0	31.0	37.0	< 3.0	< 3.0	6.8	< 3.0
June 1995	12.0	9.7	13.0	11.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	8.9	9.3	9.0	8.5	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	17.0	20.0	18.0	18.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	8.1	9.0	9.5	9.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	23.4	20.3	22.4	25.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	85.0	80.8	79.3	76.1	5.0	5.3	4.4	4.7
July 1996	65.0	66.5	77.4	75.4	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	59.8	50.3	54.0	92.0	9.9	8.6	11.5	4.9
January 1997	57.1	57.0	62.6	59.1	5.4	7.8	9.3	3.2
April 1997	67.0	48.3	48.5	55.9	< 3.0	< 3.0	< 3.0	4.2
July 1997	98.8	37.1	50.8	59.2	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 6 Continued . . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	63.0	52.0	60.0	55.0	33.0	< 20.0	20.0	25.0
September 1994	56.0	62.0	63.0	69.0	40.0	46.0	37.0	40.0
October 1994	27.0	25.0	22.0	< 20.0	20.0	< 20.0	< 20.0	< 20.0
November 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
December 1994	21.0	20.0	21.0	< 20.0	23.0	< 20.0	< 20.0	20.0
January 1995	42.0	34.0	23.0	39.0	44.0	43.0	54.0	41.0
February 1995	51.0	49.0	48.0	48.0	32.0	< 20.0	22.0	< 20.0
March 1995	35.0	30.0	28.0	36.0	27.0	40.0	36.0	29.0
April 1995	24.0	23.0	24.0	25.0	28.0	< 20.0	< 20.0	< 20.0
May 1995	58.0	70.0	79.0	57.0	36.0	29.0	25.0	28.0
June 1995	44.0	40.0	64.0	46.0	27.0	27.0	26.0	38.0
July 1995	27.0	31.0	26.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
August 1995	55.0	65.0	55.0	56.0	31.0	24.0	25.0	33.0
November 1995	30.5	39.9	36.0	34.1	< 20.0	< 20.0	23.2	< 20.0
February 1996	75.0	66.2	71.2	78.4	47.7	55.4	47.5	55.7
April 1996	135	155	147	155	50.0	54.4	50.4	55.5
July 1996	131	131	145	144	34.0	43.0	37.8	37.8
October 1996	221	254	327	266	254	239	275	230
January 1997	110	130	118	108	39.0	43.3	46.2	40.1
April 1997	98.0	77.6	81.8	90.5	25.0	28.7	25.5	30.2
July 1997	63.2	54.1	57.1	73.4	31.8	34.3	23.4	21.5

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 7

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-74

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	72.0	110.0	99.0	78.0	< 3.0	< 3.0	< 3.0	3.7
September 1994	19.0	19.0	21.0	18.0	4.5	< 3.0	5.6	< 3.0
October 1994	14.0	20.0	23.0	19.0	4.0	5.2	4.4	4.7
November 1994	16.0	11.0	15.0	16.0	< 3.0	< 3.0	< 3.0	3.2
December 1994	16.0	23.0	23.0	20.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1995	16.0	25.0	21.0	23.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	18.0	19.0	26.0	20.0	< 3.0	< 3.0	< 3.0	< 3.0
March 1995	13.0	17.0	13.0	13.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	15.0	14.0	20.0	19.0	< 3.0	< 3.0	5.2	< 3.0
May 1995	25.0	31.0	29.0	29.0	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	19.0	14.0	18.0	17.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	13.0	10.0	13.0	11.0	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	11.0	10.0	8.8	9.6	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	4.4	6.8	7.2	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	4.4	5.1	4.4	4.7	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	8.0	10.7	10.5	9.6	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	30.0	27.1	23.9	23.7	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	18.5	18.4	18.0	17.6	3.7	< 3.0	< 3.0	< 3.0
January 1997	22.6	22.0	21.3	17.2	3.7	< 3.0	< 3.0	< 3.0
April 1997	13.8	10.2	12.0	11.5	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	13.3	7.2	6.7	5.8	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 7 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	160.0	170.0	170.0	170.0	33.0	34.0	37.0	65.0
September 1994	70.0	70.0	74.0	75.0	37.0	43.0	44.0	37.0
October 1994	53.0	62.0	69.0	60.0	43.0	43.0	51.0	67.0
November 1994	78.0	74.0	78.0	70.0	51.0	55.0	65.0	53.0
December 1994	70.0	78.0	75.0	74.0	37.0	39.0	38.0	46.0
January 1995	39.0	90.0	75.0	70.0	34.0	51.0	38.0	43.0
February 1995	73.0	73.0	86.0	80.0	40.0	38.0	34.0	37.0
March 1995	68.0	92.0	66.0	66.0	59.0	53.0	39.0	53.0
April 1995	82.0	67.0	75.0	72.0	43.0	41.0	54.0	45.0
May 1995	100.0	360.0	110.0	110.0	40.0	50.0	35.0	49.0
June 1995	85.0	95.0	86.0	88.0	52.0	49.0	41.0	51.0
July 1995	69.0	110.0	67.0	100.0	44.0	55.0	44.0	82.0
August 1995	57.0	58.0	54.0	55.0	32.0	35.0	32.0	52.0
November 1995	47.1	66.0	59.5	47.7	42.6	46.1	46.8	49.9
February 1996	63.7	59.9	58.5	55.9	48.4	44.9	54.2	45.6
April 1996	70.0	61.3	79.3	57.2	55.0	43.3	58.2	42.8
July 1996	276	134	114	113	42.0	42.8	47.6	49.9
October 1996	697	412	144	564	403	42.8	604	749
January 1997	95.0	70.5	73.8	69.2	35.0	41.8	31.4	33.7
April 1997	63.0	61.8	63.3	67.0	42.0	36.1	39.7	35.4
July 1997	45.2	42.4	40.9	47.9	53.2	28.4	41.7	27.8

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 8

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-75

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	8.0	7.4	7.6	7.9	< 3.0	< 3.0	< 3.0	< 3.0
September 1994	8.9	6.8	7.4	7.2	< 3.0	< 3.0	< 3.0	< 3.0
October 1994	6.3	5.2	4.3	5.8	< 3.0	< 3.0	< 3.0	< 3.0
November 1994	4.9	7.5	6.1	6.2	< 3.0	3.3	3.9	< 3.0
December 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1995	3.6	4.9	5.0	4.2	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	< 3.0	5.2	4.5	4.4	< 3.0	< 3.0	< 3.0	< 3.0
March 1995	6.2	6.9	7.2	7.9	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	5.6	6.3	8.4	7.9	< 3.0	< 3.0	< 3.0	< 3.0
May 1995	< 3.0	4.1	3.4	3.4	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	4.4	3.3	3.2	4.0	3.5	< 3.0	< 3.0	< 3.0
July 1995	4.0	3.2	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	< 3.0	7.2	6.0	8.4	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	< 3.0	3.6	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	4.0	4.0	4.3	4.4	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	3.3	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	3.9	5.8	5.7	3.9	< 3.0	< 3.0	< 3.0	< 3.0
January 1997	9.4	10.0	8.9	8.8	< 3.0	< 3.0	< 3.0	< 3.0
April 1997	< 3.0	4.0	3.5	3.9	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	5.3	7.3	7.1	8.7	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 8 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	I	D1	D2	D3	I	D1	D2	D3
Sample Month								
August 1994	21.0	21.0	< 20.0	22.0	< 20.0	< 20.0	< 20.0	< 20.0
September 1994	20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	32.0
November 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	30.0	< 20.0
December 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
January 1995	< 20.0	< 20.0	< 20.0	< 20.0	21.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	< 20.0	21.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
March 1995	< 20.0	33.0	< 20.0	< 20.0	33.0	< 20.0	28.0	< 20.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	20.0	31.0	56.0	32.0	20.0	33.0	27.0	24.0
June 1995	25.0	22.0	28.0	25.0	22.0	24.0	25.0	61.0
July 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	28.0	< 20.0	< 20.0
August 1995	< 20.0	22.0	< 20.0	30.0	< 20.0	31.0	23.0	< 20.0
November 1995	< 20.0	23.6	< 20.0	21.0	< 20.0	< 20.0	< 20.0	25.8
February 1996	23.2	24.7	27.1	24.2	27.2	23.1	23.7	23.4
April 1996	30.0	26.6	30.2	27.7	23.0	27.0	21.6	22.9
July 1996	< 20.0	64.3	34.5	28.5	24.0	26.8	< 20.0	20.2
October 1996	252	NA	NA	NA	140	NA	NA	NA
January 1997	81.0	70.2	61.0	60.9	25.0	< 20.0	21.2	22.4
April 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
July 1997	57.1	75.4	69.6	68.2	21.2	21.3	< 20.0	< 20.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

LENOX CHINA
POMONA, NEW JERSEY

TABLE 9

STATISTICAL MONITORING RESULTS, AUGUST 1994 THROUGH SEPTEMBER 1997
MW-79A

Parameter	Lead (Unfiltered)				Lead (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	3.2	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	3.6
September 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
December 1994	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
March 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
May 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
June 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
August 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
November 1995	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
February 1996	5.9	4.1	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
October 1996	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
January 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
April 1997	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
July 1997	5.8	< 3.0	7.7	6.8	< 3.0	< 3.0	< 3.0	< 3.0

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than

TABLE 9 Continued. . .

Parameter	Zinc (Unfiltered)				Zinc (Filtered)			
Sample ID	1	D1	D2	D3	1	D1	D2	D3
Sample Month								
August 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
September 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
October 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
November 1994	< 20.0	< 20.0	< 20.0	25.0	< 20.0	< 20.0	20.0	< 20.0
December 1994	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
January 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
February 1995	< 20.0	23.0	< 20.0	< 20.0	< 20.0	< 20.0	28.0	< 20.0
March 1995	26.0	< 20.0	33.0	< 20.0	25.0	35.0	< 20.0	< 20.0
April 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
May 1995	30.0	49.0	45.0	34.0	20.0	25.0	35.0	25.0
June 1995	26.0	33.0	23.0	25.0	29.0	21.0	21.0	22.0
July 1995	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
August 1995	< 20.0	24.0	< 20.0	20.0	< 20.0	< 20.0	25.0	< 20.0
November 1995	< 20.0	25.9	21.8	21.4	< 20.0	20.5	37.1	25.2
February 1996	27.3	< 20.0	25.1	22.5	21.1	< 20.0	22.0	< 20.0
April 1996	40.0	31.0	34.8	33.2	33.0	30.6	40.3	35.5
July 1996	23.0	24.3	24.6	39.2	23.0	24.4	23.3	31.8
October 1996	***	NA	NA	NA	***	NA	NA	NA
January 1997	23.0	22.5	26.2	22.9	21.0	< 20.0	25.5	< 20.0
April 1997	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
July 1997	57.9	< 20.0	66.4	54.2	21.5	37.2	22.8	20.9

NOTES:
All values in micrograms per liter (ug/l)
< - Less Than
NA - Not analyzed

APPENDIX A

Kruskal-Wallace Test
Report Printed: 09-02-1997 14:48

Facility:Lenox97 Lenox China

Address:Lenox China

City: ST:NJ Zip:
County:

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:Pb Lead, total

CAS Number: 7439-92-1
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.000 ppb

Start Date:Aug 01 1994
End Date:Jul 01 1997

Data Mode:Original

Background Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-01	84	39	51.00	1.50	7.35	10.57
MW-03F	84	33	16.00	1.50	4.07	2.76
MW-06F	84	46	28.00	1.50	4.29	4.60

Compliance Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-12S	84	95	8.10	1.50	1.69	0.98
MW-13	84	94	8.20	1.50	1.69	0.87
MW-73	84	2	99.00	3.20	29.96	24.98
MW-74	84	6	110.00	1.50	18.95	17.58
MW-75	84	24	10.00	1.50	4.76	2.46
MW-79A	84	93	7.70	1.50	1.79	1.13

H Statistic: 403.7915
H Adjusted for Ties: 454.5432
Degrees of Freedom: 6
Chi-Squared: 12.5916
ZÁ/DF: 2.3263

* Indicates significant evidence of contamination

Well ID	Crit. Diff.	Rank Avg.	Background	Rank Avg.	Difference
MW-12S	64.0063	196.77	372.10		-175.33
MW-13	64.0063	198.20	372.10		-173.90
*MW-73	64.0063	652.43	372.10		280.33
*MW-74	64.0063	616.00	372.10		243.90
MW-75	64.0063	422.19	372.10		50.09
MW-79A	64.0063	204.60	372.10		-167.50

Kruskal-Wallace Test
Report Printed: 09-02-1997 15:07

Facility:Lenox97 Lenox China

Address:Lenox China

City: ST:NJ Zip:
County:

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:Pb dis Lead, dissolved

CAS Number: 7439-92-1
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.000 ppb

Start Date:Aug 01 1994
End Date:Jul 01 1997

Data Mode:Original

Background Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-01	84	93	6.00	1.50	1.71	0.78
MW-03F	84	67	5.20	1.50	2.25	1.12
MW-06F	84	86	3.80	1.50	1.78	0.68

Compliance Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-12S	84	99	3.30	1.50	1.52	0.20
MW-13	84	98	4.00	1.50	1.55	0.33
MW-73	84	61	23.00	1.50	4.21	4.64
MW-74	84	87	5.60	1.50	1.87	1.00
MW-75	84	96	3.90	1.50	1.57	0.39
MW-79A	84	99	3.60	1.50	1.52	0.23

H Statistic: 33.9313
H Adjusted for Ties: 100.4964
Degrees of Freedom: 6
Chi-Squared: 12.5916
ZÁ/DF: 2.3263

* Indicates significant evidence of contamination

Well ID	Crit. Diff.	Rank Avg.	Background Rank Avg.	Difference
MW-12S	64.0063	334.17	396.67	-62.50
MW-13	64.0063	338.70	396.67	-57.96
*MW-73	64.0063	485.80	396.67	89.14
MW-74	64.0063	380.45	396.67	-16.21
MW-75	64.0063	343.01	396.67	-53.66
MW-79A	64.0063	334.37	396.67	-62.30

Kruskal-Wallace Test
Report Printed: 09-02-1997 15:12

Facility:Lenox97 Lenox China

Address:Lenox China

City: ST:NJ Zip:
County:

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:Zn Zinc, total

CAS Number: 7440-66-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.000 ppb

Start Date:Aug 01 1994
End Date:Jul 01 1997

Data Mode:Original

Background Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-01	84	63	535.00	10.00	36.70	88.30
MW-03F	84	62	738.00	10.00	33.35	89.40
MW-06F	84	65	499.00	10.00	25.42	56.91

Compliance Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-12S	83	78	587.00	10.00	26.23	73.46
MW-13	84	65	332.00	10.00	25.50	48.37
MW-73	84	10	327.00	10.00	68.00	59.15
MW-74	84	0	697.00	39.00	101.18	102.26
MW-75	81	56	252.00	10.00	24.95	31.57
MW-79A	81	57	376.00	10.00	23.44	41.66

H Statistic: 268.8691
H Adjusted for Ties: 308.9181
Degrees of Freedom: 6
Chi-Squared: 12.5916
ZÁ/DF: 2.3263

* Indicates significant evidence of contamination

Well ID	Crit. Diff.	Rank Avg.	Background Rank Avg.	Difference
MW-12S	63.6996	260.34	310.92	-50.58
MW-13	63.4137	300.14	310.92	-10.78
*MW-73	63.4137	561.01	310.92	250.09
*MW-74	63.4137	658.12	310.92	347.20
MW-75	64.2884	335.73	310.92	24.82
MW-79A	64.2884	322.27	310.92	11.35

Kruskal-Wallace Test
Report Printed: 09-02-1997 15:16

Facility:Lenox97 Lenox China

Address:Lenox China

City: ST:NJ Zip:
County:

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:Zn dis Zinc, dissolved

CAS Number: 7440-66-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.000 ppb

Start Date:Aug 01 1994
End Date:Jul 01 1997

Data Mode:Original

Background Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-01	84	70	578.00	10.00	29.73	80.67
MW-03F	84	62	858.00	10.00	38.58	113.74
MW-06F	84	68	245.00	10.00	18.25	26.72

Compliance Wells

Well ID	N	%ND	Max Value	Min Value	Mean	Std Dev
MW-12S	83	78	353.00	10.00	21.43	48.59
MW-13	84	56	238.00	10.00	26.13	40.76
MW-73	84	30	275.00	10.00	38.32	49.74
MW-74	84	0	749.00	28.00	63.92	104.90
MW-75	81	59	140.00	10.00	18.04	16.51
MW-79A	81	62	635.00	10.00	24.00	69.32

H Statistic: 221.2087
H Adjusted for Ties: 262.0847
Degrees of Freedom: 6
Chi-Squared: 12.5916
ZÁ/DF: 2.3263

* Indicates significant evidence of contamination

Well ID	Crit. Diff.	Rank Avg.	Background Rank Avg.	Difference
MW-12S	63.6996	269.81	314.48	-44.67
MW-13	63.4137	352.63	314.48	38.14
*MW-73	63.4137	487.64	314.48	173.16
*MW-74	63.4137	664.12	314.48	349.64
MW-75	64.2884	328.19	314.48	13.71
MW-79A	64.2884	324.44	314.48	9.96

APPENDIX B

APPENDIX B
LEAD, ZINC, AND TCE ATTENUATION MECHANISMS

Lead (Pb)

In natural aqueous environment, lead (Pb) primarily exist as Pb^{+2}. The dominant aqueous species are Pb^{+2} in acidic conditions and $^{+}$Pb -carbonate complexes in alkaline conditions. Both precipitation/dissolution and adsorption/desorption control Pb concentrations in the aquifer. Lead-phosphates in noncalcareous sediments and $PbCO_3$ in calcareous and alkaline soils sediments have been reported to be solubility-controlling solids. Iron and manganese oxides are strong specific adsorbents for Pb. In addition to specific adsorption, Pb retention also occurs through ion exchange. Except at high Pb concentrations where ion exchange predominates, competing ions appears to have little effect on Pb adsorption.

Pb is strongly retained by soils, by ion exchange and specific adsorption. The soil properties which most often correlate with Pb adsorption are soil organic matter and clay content, and studies also clearly demonstrated the importance of iron and manganese oxides. Although their apparent binding energies do not vary appreciably, the adsorption capacity of individual soil constituents decrease in the following order: Manganese oxides, iron oxides, organic matter, and clay minerals.

The adsorption of Pb is strongly pH dependent on sediments, iron oxides, clay minerals, and organic matter. Pb adsorption is high and less pH dependent on manganese oxides. The effects of competing ions on Pb adsorption is strongly dependent on whether Pb solution concentrations exceed the specific adsorption capacity of soil/subsoil or an individual adsorbent. The adsorption of Pb on soils, sediments, and clay minerals often conforms to the Langmuir isotherm over a narrow range in Pb concentration.

Zinc (Zn)

The dominant zinc (Zn) solution species in groundwater at pH values <8.2 is Zn^{+2}. The precipitation/dissolution attenuation mechanism has not been adequately studied. Most of the available adsorption/desorption data were obtained with high Zn concentrations. As results, these data were not applicable to the aquifer with low Zn concentration expected (<700 ug/L). At low Zn concentrations, Zn is specifically adsorbed by iron, aluminum, and manganese oxides. At higher Zn concentrations, non-specific adsorption is the controlling adsorption mechanism.

Like other cationic heavy metals, Zn is adsorbed specifically and by ion exchange. The predominant adsorbents controlling the adsorption behavior of Zn are iron and manganese oxides with less contribution from soil organic matter and clay minerals. The pH dependence of Zn adsorption decreases at higher solution concentrations of Zn and when clay minerals are used as adsorbents. Both the Langmuir and Freundlich isotherms are used to described Zn adsorption in soil.

Trichloroethene

Chlorinated solvents, such as trichloroethene (TCE), are relatively oxidized in the environment.

Consequently, there is less energy to be gained by a microorganism in oxidizing them further. Instead, they are used as electronic acceptors and are reduced to less oxidized, and less chlorinated byproducts through reductive dehalogenation, which is the most significant degradation pathway for highly chlorinated solvents. The sequence of reductive dechlorination of TCE produces dichloroethylene, vinyl chloride, and ultimately ethylene, ethane, and methane.

The most reactive sorber for organic compounds in the subsurface soil is soil organic matter. Non-polar components of the organic fraction of the soil will sorb non-polar organic contaminants from solution. The transport of organic compounds in the aquifer is modeled by the retardation factor approach. Retardation factors are dependent on chemical octanol-water partition coefficeint, soil bulk density, porosity, and the content of soil organic matter. The slow-moving dissolved contaminants have high retardation factors. Rapidly-moving contaminants have low retardation factors.

APPENDIX C

LENOX CHINA

POMONA, NEW JERSEY

SUPPLEMENTAL GROUNDWATER SAMPLING AND ANALYSIS PLAN FOR THE LENOX CHINA POMONA FACILITY

PROJECT #530-3.3

NOVEMBER 1997

Office Location:

EDER ASSOCIATES

413 Riverview Executive Park

Trenton, New Jersey 08611

Office Contact:

Mark Foley

(609) 695-1050

Offices in New York, Wisconsin, Michigan, Georgia, Florida, New Jersey and Massachusetts

CONTENTS

TABLES

DRAWINGS

1.0 INTRODUCTION

Lenox China prepared a Groundwater Sampling and Analysis Plan (GWSAP) that describes the field and laboratory protocols that will be used during the groundwater monitoring program required by Lenox's NJPDES-DGW permit (No. 0086487). This Supplemental Groundwater Sampling, Analysis, and Monitoring Plan (SGWSAP) describes the work which will be performed to evaluate the effectiveness of the groundwater remediation system and to monitor groundwater quality at the Lenox site and adjacent properties. The work will consist of: 1) sampling selected monitoring wells and piezometers downgradient of the Lenox facility to monitor the extent of two TCE plumes migrating from the facility; 2) sampling selected monitoring wells to assess groundwater quality downgradient of Solid Waste Management Unit No. 2 (SWMU) and the Area of Concern (AOC); 3) sampling two downgradient sentinel wells to monitor Classification Exception Area (CEA) compliance; and 4) measuring water levels in on- and off-site monitoring wells, piezometers, and well points to track groundwater elevations.

All sampling activities described in this plan will be performed in accord with the procedures outlined in the GWSAP approved by NJDEP.

2.0 GEOLOGY AND HYDROGEOLOGY

The regional and site-specific geology and hydrogeology have been described in several reports submitted to NJDEP by EDER and G&M. The site is underlain by the Cohansey Sand/Kirkwood Formation, a white, tan, and yellow-orange unconsolidated sand and gravel deposit interbedded with varying amounts of silt and clay. A discontinuous one to five foot thick clay layer is present at approximately 65 to 70 feet below grade.

Depth to water beneath the site ranges between three and ten feet below grade. The water table has fluctuated seasonally between three and nine feet. Groundwater flows from west to east-northeast under a relatively flat gradient (0.0007 ft/ft). Aquifer pumping tests were performed in 1988 and the calculated transmissivities ranged from 56,000 to 70,000 gallons per day per foot. Calculated storativities ranged from 0.002 to 0.016.

3.0 GROUNDWATER SAMPLING

This section describes the sample collection program to be performed at the Lenox facility. Table 1 summarizes the sampling program and Table 2 shows the sample container, preservative, and holding time requirements.

3.1 TCE Plumes

Groundwater samples will be collected quarterly from monitoring wells MW-1, MW-10, MW-12S, MW-13, MW-15, MW-25, MW-75, MW-76, MW-77, MW-78, MW-79A, MW-80, MW-81, B-31 and B-59 to assess overall changes in the distribution and concentration of TCE in groundwater downgradient of the Lenox property. An additional seven wells (MW-12D, B-32, B-53, B-54, B-66, and B-71) will be sampled annually. This monitoring well network was proposed because of the strategic locations of the selected wells within and along the TCE plume boundaries. The well and piezometer locations are shown on Drawing 1-2.

3.2 SWMU No. 2 and AOC

Filtered and unfiltered samples will be collected annually from monitoring wells MW-10, MW-72, MW-73, and MW-74 to assess groundwater quality downgradient of SWMU No. 2 and the AOC. The well locations are shown on Drawing 1-2.

3.3 CEA Monitoring Program

Monitoring wells along White Horse Pike (MW-75 and MW-79A) will be used as downgradient sentinel monitoring wells to verify CEA compliance. These wells will be monitored quarterly. CEA compliance for lead and zinc will be determined by a statistical comparison of the downgradient sentinel well groundwater monitoring results and the arithmetic mean calculated for zinc in the upgradient monitoring well MW-1 (36.7 μg/l) and the 10 μg/l groundwater protection limit for lead. CEA compliance for TCE will be determined by comparing the monitoring results from sentinel monitoring wells to the 1 μg/l GWQC and by using the Mann-Whitney U-Test (N.J.A.C. 7:26E Appendix C).

3.4 Chain of Custody Documentation

Chain of custody documentation will be prepared as described in the GWSAP.

3.5 Analytical Parameters

Groundwater samples from the wells and the GAC treatment unit will be analyzed for the parameters shown in Table 1. The required detection limits and laboratory methods to be used are summarized in Table 3.

3.6 Groundwater Elevation Measurements

Depth to water and total well depth measurements will be made quarterly in the on-site and off-site monitoring wells mentioned in Section 3.1 using the procedures outlined in the GWSAP. The depth to water data will be used to track groundwater elevations to depict the groundwater flow direction.

3.7 Field Equipment Decontamination Procedures

All down-well measuring and sampling equipment not dedicated to specific wells would be decontaminated as described in the GWSAP.

3.8 Quality Assurance/Quality Control

The QA/QC program described in the GWSAP will assess the reliability and validity of the field and analytical laboratory data.

LENOX CHINA
POMONA, NEW JERSEY

TABLE 1

GROUNDWATER MONITORING PROGRAM SUMMARY

Monitoring Program	Wells	Parameters	Frequency
TCE	MW-1, MW-10, MW-12S, MW-13, MW-15, MW-25, MW-75, MW-76, MW-77, MW-78, MW-79A, MW-80, MW-81, B-31, B-59	Total Suspended Solids Total Dissolved Solids Trichloroethene 1,1-Dichloroethene Trans-1,2-Dichloroethene Cis-1,2-Dichloroethene Vinyl Chloride Iron, Lead, Zinc(1)	Quarterly
	MW-1, MW-10, MW-12S, MW-12D, MW-13, MW-15, MW-25, MW-75, MW-76, MW-77, MW-78, MW-79A, MW-80, MW-81, B-31, B-32, B-53, B-54, B-59, B-66, B-71	Total Suspended Solids Total Dissolved Solids Trichloroethene 1,1-Dichloroethene Trans-1,2-Dichloroethene Cis-1,2-Dichloroethene, Vinyl Chloride, Iron, Lead, Zinc(1)	Annually
SWMU No. 2 and AOC	MW-10, MW-72, MW-73, MW-74	Lead, Zinc(1)	Annually
CEA Monitoring Program	MW-1, MW-75, MW-79A	Trichloroethene Lead, Zinc(1)	Quarterly

NOTES:
(1) Filtered and Unfiltered samples will be collected and analyzed for the specified metals.

LENOX CHINA
POMONA, NEW JERSEY

TABLE 2

SAMPLE CONTAINER, PRESERVATIVE, AND HOLDING TIME REQUIREMENTS

Parameter	Container	Preservative	Holding Time
Trichloroethene 1,1-Dichloroethene Trans-1,2-Dichloroethene Cis-1,2-Dichloroethene Vinyl Chloride	G, Teflon lined Septum (3 x 40 ml)	Cool, 4°C Hcl to pH<2	14 days
Iron, Lead, Zinc	P (1000 ml)	Cool, 4° HNO_3 to pH<2	6 months
TSS/TDS	P,G (250 ml)	Cool, 4°	7 days

LENOX CHINA
POMONA, NEW JERSEY

TABLE 3

ANALYTICAL PARAMETERS, DETECTION LIMITS, AND LABORATORY METHOD REQUIREMENTS

Parameter	Detection Limit	Laboratory Method
Trichloroethene 1,1-Dichloroethene Trans-1,2-Dichloroethene Cis-1,2-Dichloroethene Vinyl Chloride	0.19 μg/ℓ	USEPA 524.2 or USEPA 502.2
Iron	0.05 mg/ℓ	USEPA 200.7
Lead	0.005 mg/ℓ	USEPA 239.2
Zinc	0.02 mg/ℓ	USEPA 200.7
TSS	5 mg/ℓ	USEPA 160.2
TDS	5 mg/ℓ	USEPA 160.1

APPENDIX D

LENOX CHINA
POMONA, NEW JERSEY

APPENDIX D

CLASSIFICATION EXCEPTION AREA (CEA) INFORMATION

I. General Information

1. Applicant/Owner

Name Lenox, Inc.

Address 100 Lenox Drive, Lawrenceville, New Jersey 08648

Telephone # 609-896-2800

2. Location of Activity

Name of Facility Lenox China

Adresss Tilton Road, Pomana, New Jersey 08240

Site Contact John Kinkela Telephone # 609-965-8272

Lead and Zinc CEA Boundary

Lot No. 1 Block No. 453

Lot No. 1, 2, 3 Block No. 457

Longitude 74.36.08 Latitude 39.29.12

TCE CEA Boundary

Lot No. 1 Block No. 453

Lot No. 1, 2, 3 Block No. 457

Lot No. 4, 5, 6, 7, 8, 9, 10, 11 Block No. 459

Longitude 74.36.08 Latitude 39.29.12

II. CEA Specific Information

Affected Aquifer Cohansy Aquifer (Class I-PL)

Contaminants of Concern Lead and Zinc, and TCE

Estimated Logevity of CEA Indeterminate

III. Figures

☒ U.S.G.S. 7.5 Minute Quadrangle Map showing CEA boundaries

☒ Site Plan showing CEA boundaries

MEMORANDUM

To: Bureau of Water Allocations
Water Supply Element

From: Lenox China, Pomona, New Jersey

Subject: Well Restriction Area (WRA)

Date: June 22, 1998

1. A WRA has been established in Galloway Township, Atlantic County. A list of affected blocks and lots is shown in Table 1 below as well as a map of the area (Drawing 1-2).

2. The point of contact for all questions concerning the delineation of the WRA is NJDEP Case Manager Frank F. Faranca, Division of Responsible Party Site Remediation, Bureau of Federal Case Management.

3. The following conditions and construction requirements apply to wells installed within the WRA:

   Casing must be installed into the clay layer which underlays the upper 60 to 70 feet of the Cohansey Aquifer and water must be withdrawn from the water bearing zone below this clay layer.

   These conditions apply to the following wells:

Domestic	Domestic Replacement
Irrigation	Irrigation Replacement
Heat Pump/Geothermal	Heat Pump/Geothermal Replacement
Industrial	Industrial Replacement
Public Community	Public Community Replacement
Public Non-Community	Public Non-Community Replacement
Non-Public	Non-Public Replacement
Gas Vent	Gas Vent Replacement
Oil & Gas Exploration	Close Loop Geothermal
Livestock	

3. The following conditions and construction requirements apply to wells installed within the WRA:

<u>Water from wells cannot be used as potable water.</u>

These conditions apply to the following wells:

Monitoring/Observation	Monitoring/Observation Replacement
Piezometer	Piezometer Replacement
Recovery	Recovery Replacement
Test	Dewatering
Boring/Probe Hole	Injection
Recharge	Cathodic Protection
Fire	Inclinometer